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THE ENERGY SECTOR IN THE NATIONAL ECONOMY:

PLANNING AND STRATEGIES IN SOME AFRICAN DEVELOPING COUNTRIES

NOVEMBER 1984

1. Introduction

The sharp increase in the price of energy during oil crisis of 1973 and the associated changes in the relative costs of alternative energy sources have imposed a colossal planning and strategy burden on developing african countries. In all member States there was a need to conserve energy and to replace expensive sources of energy with cheaper ones. Those african developing countries that rely heavily on imported oil, especially, need to step up their efforts to identify and invest in their own energy resources. Designing and carring out strategies for the energy transition in Africa requires better planning both within enterprises supplying energy and at the national level, where there is a need to coordinate the activities of suppliers and to promote efficiency in energy consumption. The quality of planning is the key to future investments; not only to identifying projects and implementing them successfully, but also to raising the finance for them.

The deterioration in economic conditions in african developing countries, the condition that has been prevailing for the last decade, continued during1984. Faced with a critical economic environment, african governments have intensified their search for adjustment policies, including those relating to energy sector.

2. The current energy situation in Eastern and Western Africa

In the World Bank Annual Report for 1983 there is an analysis of energy situation in member States of Eastern and Western Africa and regional perspectives for these areas are outlined.

(a) Eastern Africa

In Eastern Africa the Bank, together with UNDP has completed energy assessment reports for Burundi, Kenya, Malawi, Mauritius, Rwanda, Zambia and Zimbabwe : others are under way (as in Sudan and Uganda), or will soon be scheduled, in the rest of the region's member countries These reports have provided a good basis for discussion and meaningful policy action.

The emphasis of energy policy must be on expanding local production, since the scope for conservation is limited by low levels of present, per capita consumption. The region has large hydro, coal, and geothermal potential that awaits exploitation. Potential also exists in the long run for utilizing, economically, energy from the sun and wind. There is room for considerable improvement in the utilization of energy from fuelwood. The charging of economic prices and suitable taxation of petroleum products must sharpen incentives for saving foreign exchange and exploiting local resources.

The hydroelectric potential in the region is very large, particularly in Ethiopia, Uganda, Zaire, Zambia and Zimbabwe. Only a small part of this resource has been developed so far. The cost of installing generating capacity can vary from $1,000 per kW (1980 prices) for small units to $2,600 per kW for large ones. The Bank has played a substantial role in helping these countries do design least-cost solutions to their power needs, to establish and develop institutions in this sector, and to mobilize external finance for hydropower investments. In addition, financing has been provided for coal-based power projects in Botswana and Zimbabwe. These conventional projects constituted nearly 82 percent of total energy lending by the Bank to Eastern Africa in fiscal 1983.

While hydro and coal-based power is important, by far the most important source of energy in the region is fuelwood. It accounts for over 90 percent of total energy production and consumption, except in a few countries of the region. Mounting demographic pressure and the wide-spread practice of consuming wood as a free good without replanting it have precipitated a supply crisis in some areas. If current trends continue, however, environmental damage will accumulate and cause serious injury.

To some extent, demand for fuelwood can be restrained by improving the efficiency of its use. In Burundi, Kenya, Malawi, and Rwanda, the Bank is participating in attempts to improve the efficiency of wood and charcoal burners and to introduce cooking stoves. Conservation in industrial processes is improving; for example, in Malawi, attempts are being made to improve furnaces and burners designs in the tobacco industry with a view to reducing consumption of fuelwood by 50 percent.

Another recent thrust of Bank lending in Eastern Africa is for exploration and development of indigenous energy sources. In fiscal 1983 finance was extended for coal engineering in Zambia and Tanzania, as well as petroleum exploration in Ethiopia and Madagascar. Activities financed by the Bank in gas exploration in the Songo Songo field area in Tanzania have resulted in gas finds to date that have far exceeded earlier expectations (about 500 billion cubic feet). Proven reserves are now established, which are the equivalent of sixty-five years to seventy-five years of electricity consumption at existing levels. In Kenya, two Bank-assisted geothermal projects totaling 30 mW, supplied 10 percent if the country's electricity consumption in fiscal 1983.

Eastern Africa's potential in other renewable resources, biomass, solar, wind, small hydro - holds out promise in the long term that the needs for small-scale decentralized power sources for agricultural and rural development can be met. The Bank is encouraging solar research in Zimbabwe and Mauritius; and in Burundi, the use of peat.

Possibilities for conservation of imported energy, and therefore for saving foreign exchange, are also being explored within the transport sector, which on the average, absorbs about half the oil imports in Eastern African countries. This burden of imports is particularly acute for the land locked countries, which had to pay landed costs averaging $100 per barrel of oil in 1982. Overall, most countries seem to be moving toward a more efficient use of energy by improving maintenance procedures for roads and vehicles and by acquiring light, energy efficient vehicles. Possibilities for saving fuel are also being tapped in the industrial sector; for example, the substitution of coal for petroleum in the Bamburi cement factory in Kenya will reduce fuel costs by at least 25 percent. In Zaire, the change-over from using oil-fired boilers for heating and producing process steam to electric boilers means that idle hydropower capacity there will be put to use.

In general, Eastern African countries have reacted to the increase in petroleum prices during the period 1974-81 by passing them on the consumer. However, distorting exist, and a common one has been subsidized diesel fuel and kerosene. To determine the cost of supply and to design a structure for tariff rates, the Bank has financed many tariff studies. Based partly on these analyses, power tariffs in 1982 rose by 50 percent in Tanzania, 20 percent in Swaziland and 8.5 percent in Malawi. An increase of about 85 percent took place in Sudan, in mid-1983.

(b) Western Africa

The problem of energy supply in Western Africa is primarily that of fuelwood, which in most countries, accounts for more than 80 percent of all energy consumption. The depletion of forest capital is most pronounced in the Sahelian countries, but even in the coastal States further South, local imbalances between supply and demand create similar problems on an increasing scale.

Current wood consumption in the Sahelian countries is approximately one kilogram of dry wood per person daily and far exceeds the capacity of local forest resources. If wood-consumption practices continue unchanged, only 65 percent of domestic energy needs will come from natural forests and managed tree plantations by the year 2000. Most countries will have to halve their fuelwood consumption by the turn of the century if there are to be any forests left. Reduction in wood consumption can be achieved through more efficient usage and substitution of other energy sources, but considerable deforestation also takes place because of land being brought into cultivation and because of overgrazing. A recent study by the FAO estimates that the areas affected add up to a million hectares each year in the Sahelian countries. Consequently, in order to avoid irreversible damage to the environment, agropastoral programmes are needed in addition to those designed to deal with the fuel-wood scarcity.

It is becoming apparent that afforestation is only a partial solution to the fuelwood supply problem. A more comprehensive approach to energy supply in rural regions is necessary, specifically to examine how commercial energy could become a substitute for fuelwood (by appropriate policies on pricing, supply, changing traditions, and introduction of efficient appliances).

Commercialized energy supply to the modern sectors of the National economies in Western Africa is hampered by the lack of basic infrastructure. Hence, much Bank activity is being directed toward improved knowledge of energy resources. Petroleum-sector assistance is being provided to nine countries to promote exploration and eventually, exploitation of indigenous resources. Inventories of hydroelectric-power resources are being made under IDA technical-assistance credits to Benin and Togo and under an IBRD-administered UNDP grant to Guinea. Because the major hydro resources of the region are concentrated in a few countries, the preparation for their development will be facilitated by regional co-operation in joint studies of water resources and electrical interconnections. The Bank supports therefore, the organizations established for such a purpose by the countries of the region, such as the Niger Basin Authority.

Another problem in meeting the energy requirements of the modern sector in Western Africa is that of institutional weakness, the root cause of which is a shortage of trained manpower. In Bank technical-assistance projects, increasing attention is being paid to manpower-training needs in those energy-sector entities that have difficulty coping with the demands imposed by economic growth. In addition, there is increasing concentration on the relationships between the governments and parastatal enterprises, as well as to their rehabilitation.

In developing African countries energy planning and policies must take into account the socio-economic duality created by co-existence of a modern and a traditional sector.

This duality is characterized by different patterns of energy consumption and supply: in the modern sector, life style and technologies resulting in energy use mostly based on petroleum; in a traditional sector, a subsistence economy, based on low-energy intensity, dispersed demand and supply, but are often threateningly high consumption of limited fuelwood resources. Many african developing countries are affected severely by both oil and fuelwood crises, which reinforce one another.

National energy planning cannot be undertaken in a vacuum. While all countries should strive for reasonable self-reliance, the nature of interdependent world demands co-operation and co-ordination with neighbors in the region.

National energy planning can be described as a process whereby a country (1) determines its needs; (2) carries out an appraisal of available resources; (3) determines the best means to develop the energy resources (or alternatively to import them), and (4) organizes the necessary skiles and financing from internal sources (including the private sector) and from international sources as needed.

4. Formulation and coordination of national strategies

Once a diagnosis of the country's energy issues and options has been carried out (either internally or with external assistance such as through an Energy assessment Report), the three tasks facing the Energy Ministry are:

(i) Identify and obtain government consensus on the priority policy or investment areas for follow-up;

(ii) identify and get agreement on the agencies that will carry out the required follow-up work in specific priority areas; provide them with guidance or technical support needed for this.

(iii) solicit external financial or technical assistance required for these priority projects and seek to ensure that donor assistance is channeled first to the agreed priority areas.

There are a number of ways of organizing this process and appropriate institutional arrangements will vary from country to country but in almost all cases they will require the presence of a small group of technical/economic staff whose main task will be to orchestrate the process and serve as a focal point for coordinating the work of subsector and donor agencies. Regardless of where it is located, this group will need to have access to senior policy makers. To accomplish the first two tasks it may also be useful to establish an interagency co-ordination committee, for which the small energy planning group could act as a technical secretariat.

In the third area - obtaining donor assistance for priority projects - a major constraint is the shortage of well defined and justified project profiles which would translate initial project ideas into a specific program of work required to prepare and implement the project. This will help to overcome the current paradoxical situation of a surfeit of potentially profitable projects that are not being developed in many countries and, at the same time, the difficulty that many donor agencies are having in identifying priority projects to assist in the energy sector.

5. Conclusion

One of the most difficult tasks facing the majority of the African developing countries (but one that is unavoidable if they are to resume healthy growth) is to adjust their economies to the higher costs of energy. For many, expanded investments to increase energy production and to raise the efficiency of their energy use will be central to the process of economic growth. These investments require:

(i) The mobilization of funds on an unprecedented scale, both externally and from domestic sources, particularly through operating surpluses in energy enterprises; and

(ii) the upgrading of human resources to ensure that investments in energy development form part of a rational strategy, and that energy programs and projects are designed and executed in a cost-effective manner.

The principal objective of the Bank's energy program is to assist developing countries to define and implement an appropriate development strategy for energy sector. The urgency and the magnitude of the necessary structural adjustments demand greater attention to policy and management issues, preinvestment studies to formulate better strategies for energy supply and utilization, and the mobilization of financing. The Bank functions as a catalyst in promoting strategy formulation, policy reform, and institutional improvements; and in mobilizing external sources of technology and finance to implement effectively the changed investment priorities in developing countries. It has expanded and diversified its energy lending and is putting greater emphasis on assisting borrowers in the choice and use of new technologies, strengthening institutions, and improving the policy framework in the energy sector.

Source: Energy Policy Seminar, sub-saharan Africa - I
Washington, D.C. March 5-9, 1984.

Yves Rovani: "Energy transition in developing countries" Finance and Development, December 1983.

Masood Ahmed: "Formulation and co-ordination of national strategies"(outline), EDI African Energy Policy Seminar.

World Bank: Annual Report, 1983 Chapter Four,
1983 Regional Perspectives.